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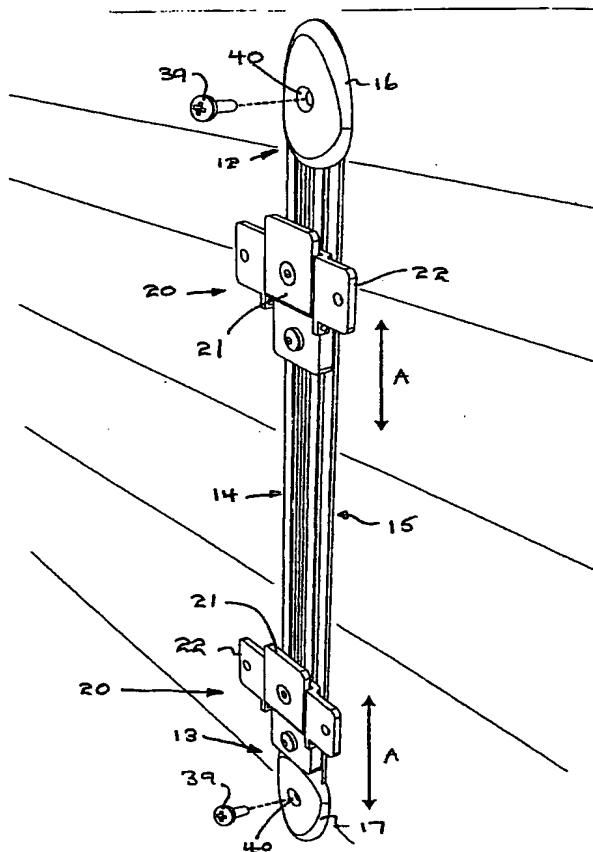
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(54) Title: FLAT PANEL DISPLAY WALL MOUNTING SYSTEM



(57) Abstract: A wall mounting system for a display has an
elongated rail (11) having first and second ends (12, 13), a
front face (14) and a rear face (15), the rail (11) being secured
to the wall with its rear face against the wall, and a releasable
mounting bracket (20) for securing the panel display to the front
face of the wall, the mounting bracket (20) having a first portion
(21) adapted to be secured to the rail (11) and a second portion
(22) adapted to be secured to the panel display, the first and
second portions (21 and 22) being releasably engageable with
one another.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. ⁷: A47B 96/07 A47G 1/16, 1/24, 29/02

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B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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WPAT, A47B 96/07 A47G 1/16, 1/24, 29/02, 29/00 G02B 7/18, 7/182 HO5K 7/14, 7/16, 7/18 HO4N 5/655 F16M 13/00, 13/02, key words RAIL+, TRACK+, SLID+, RUN+, WALL+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	EP 1034727 B (HAYDE G S) 13 September 2000. Whole document	1-7 8
X A	US 6286802 B (MUNSON et al.) 11 September 2001 Whole document	1-7 8
X A	CA 2248520 A (NORTH SCREEN STUDIO LTD) 30 March 2000. Whole document	1-7 8
X A	US 2003/0029986 A (ZULLER) 13 February 2003 Whole document	1-7 8

☒ Further documents are listed in the continuation of Box C☒ See patent family annex

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

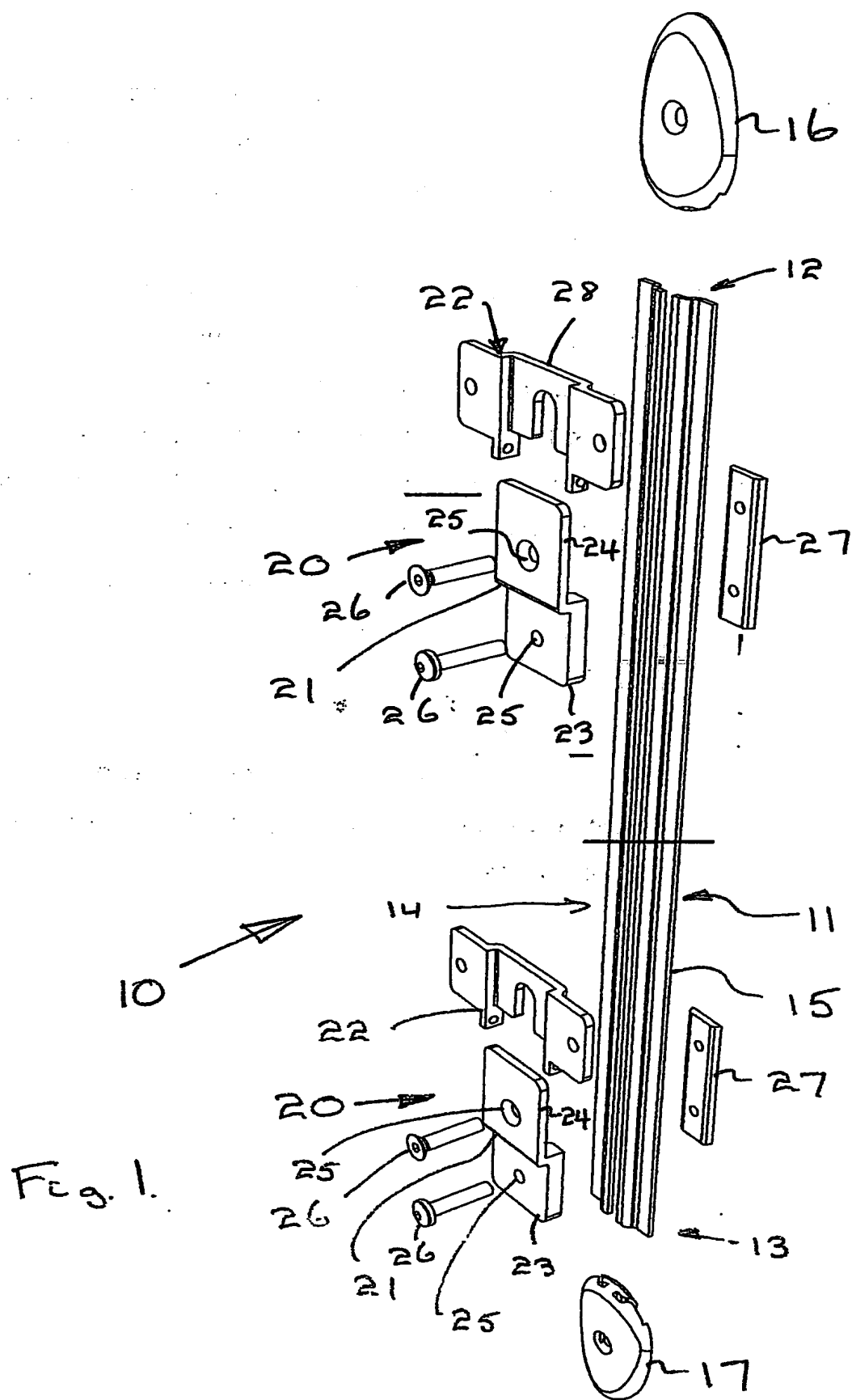
Patent Document Cited in Search Report		Patent Family Member
EP	1034727	NONE
US	6286802	NONE
CA	2248520	NONE
US	2003029986	US 2002109064
US	5342014	NONE
Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.		
END OF ANNEX		

INTERNATIONAL SEARCH REPORT

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 5342014 A (WILSON) 30 August 1994 Whole document	1-7 8



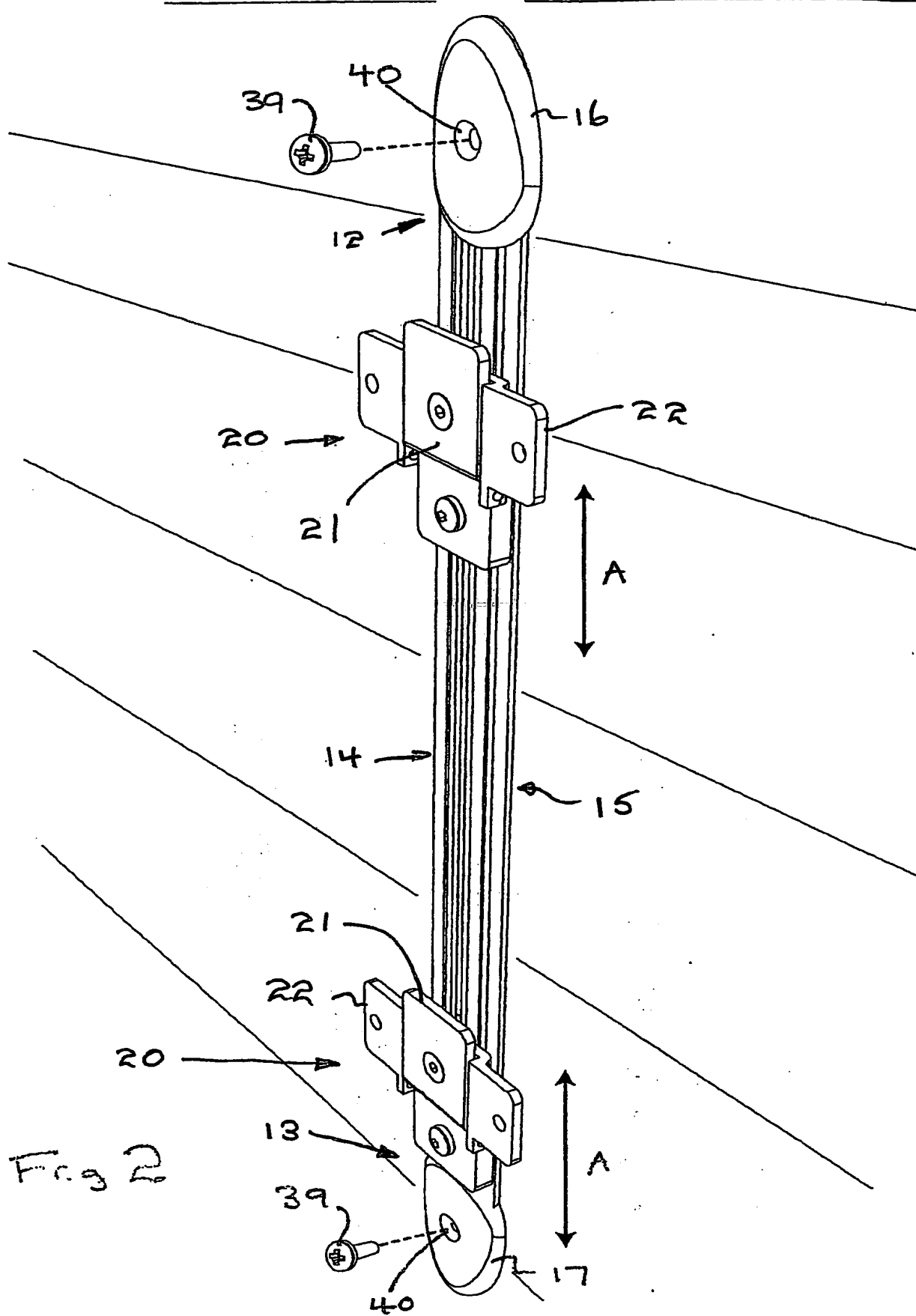


Fig 3.

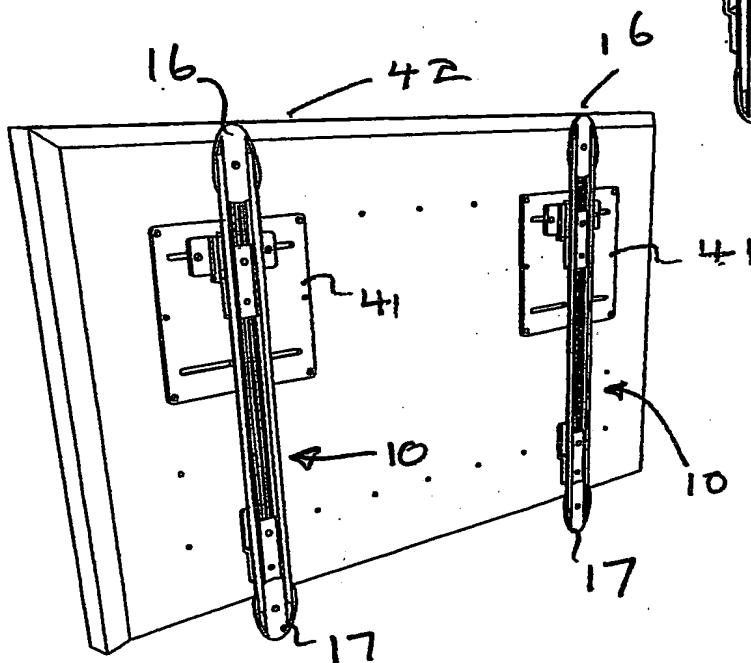
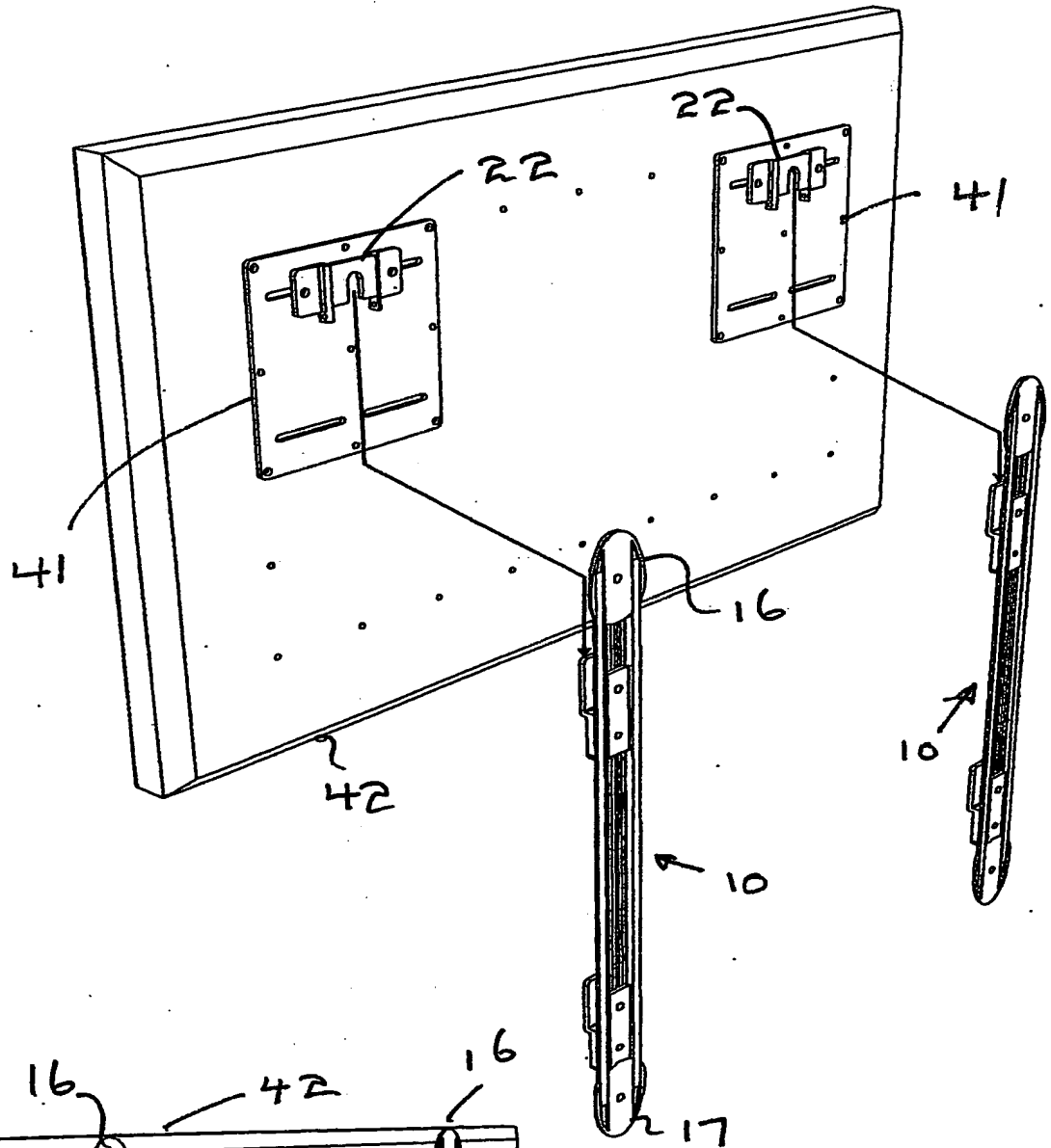


Fig. 4

Fig. 5.

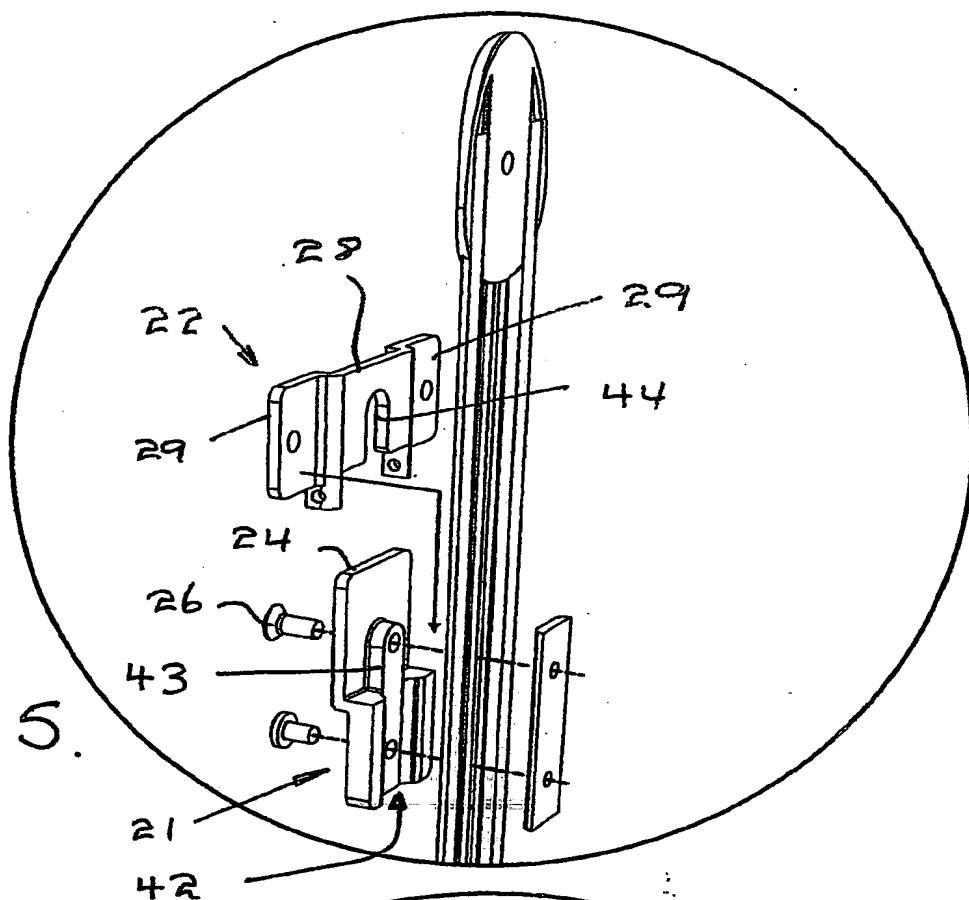


Fig. 6.

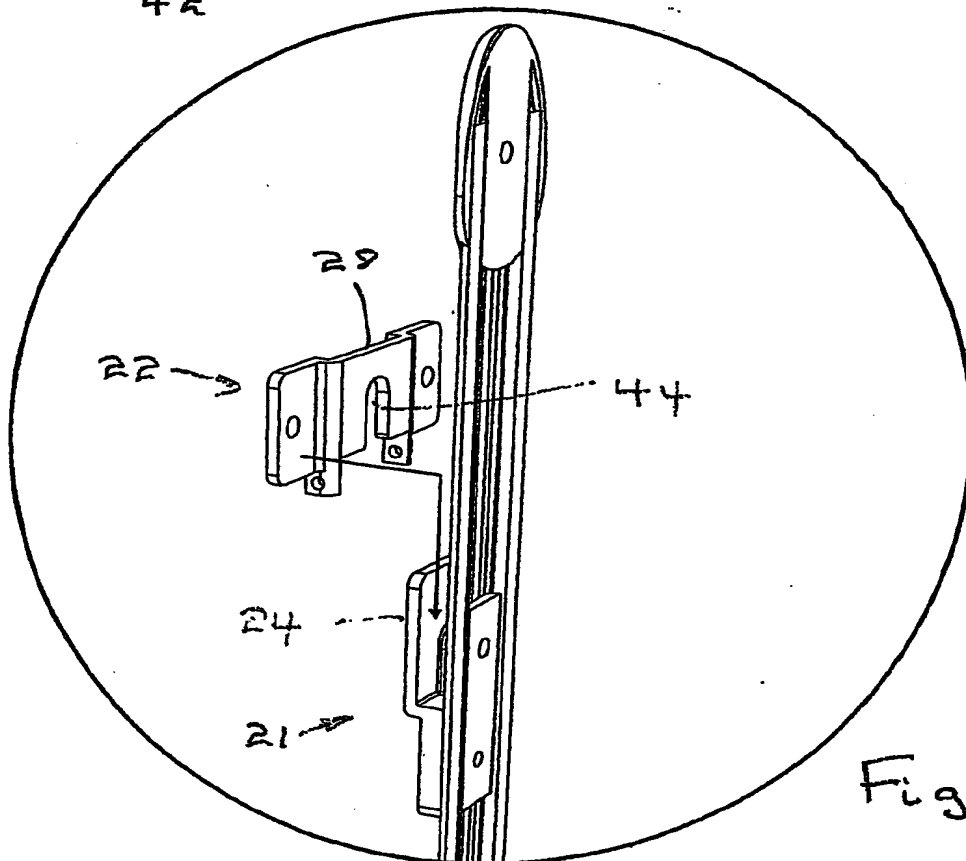


Fig. 7

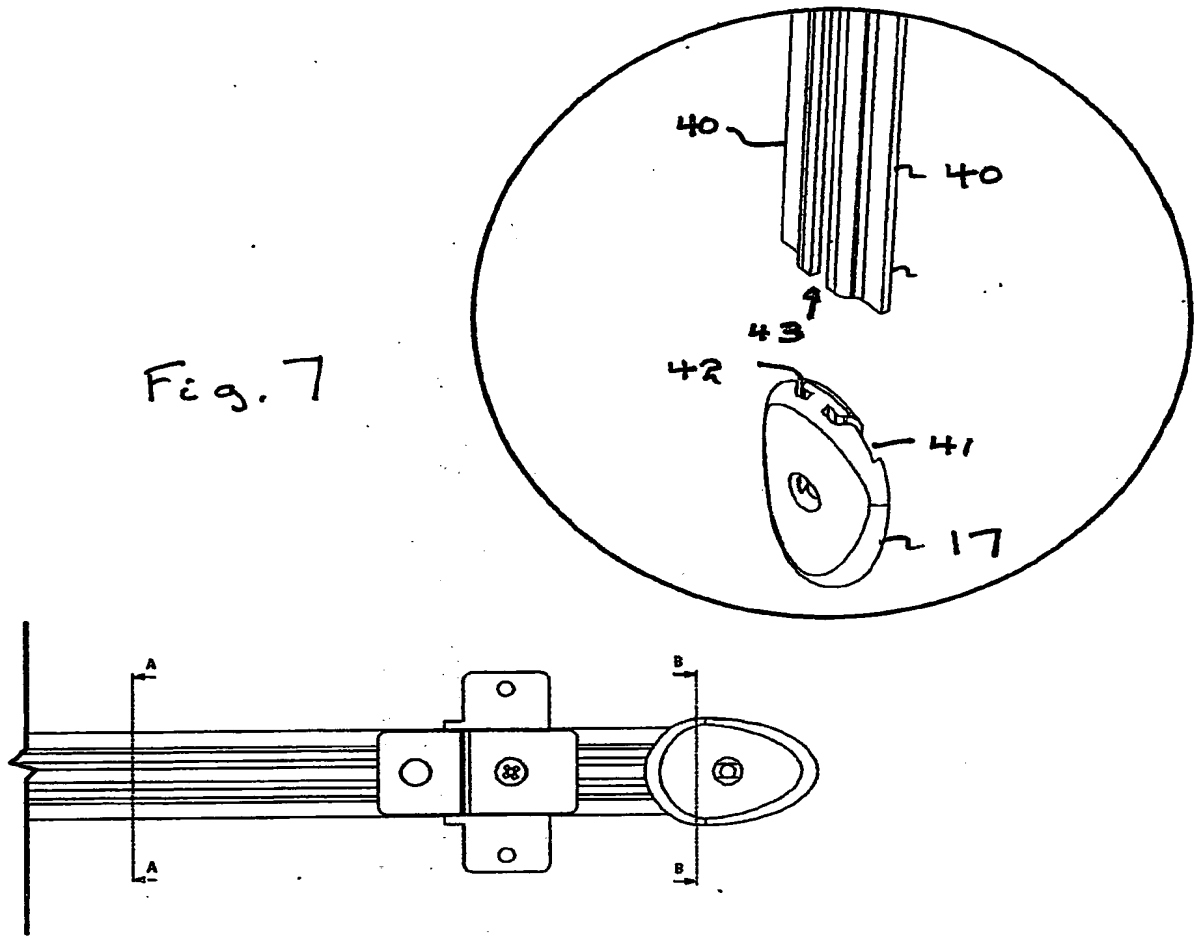
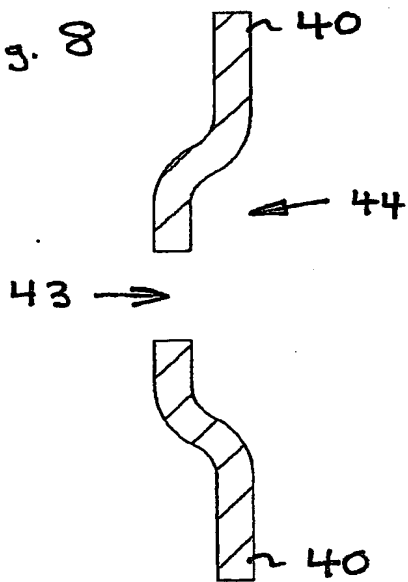
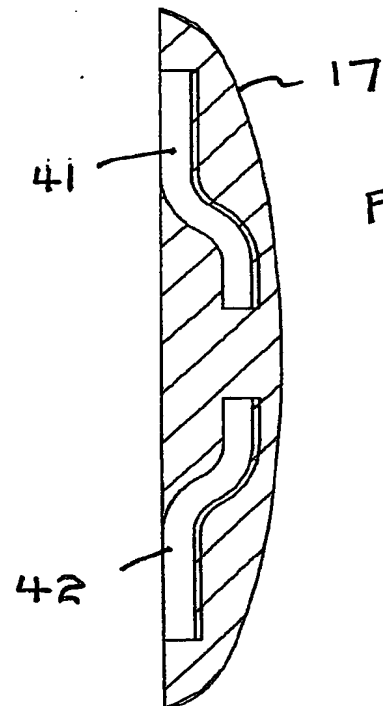


Fig. 8



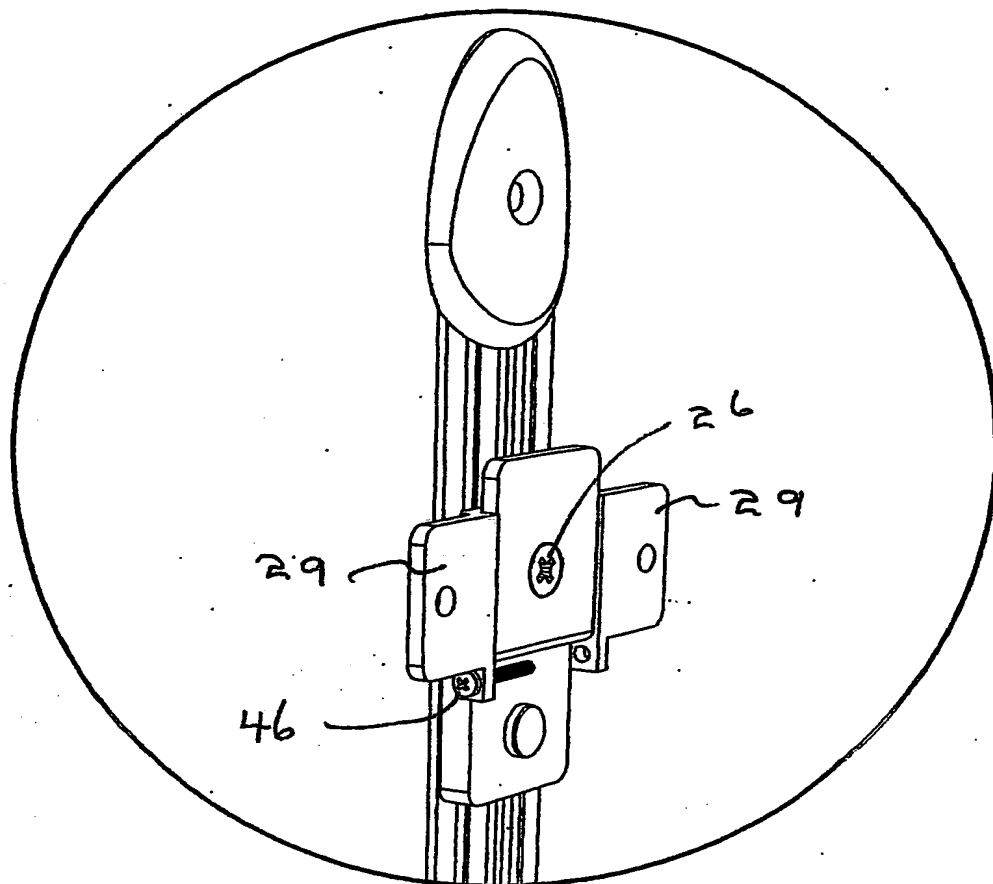
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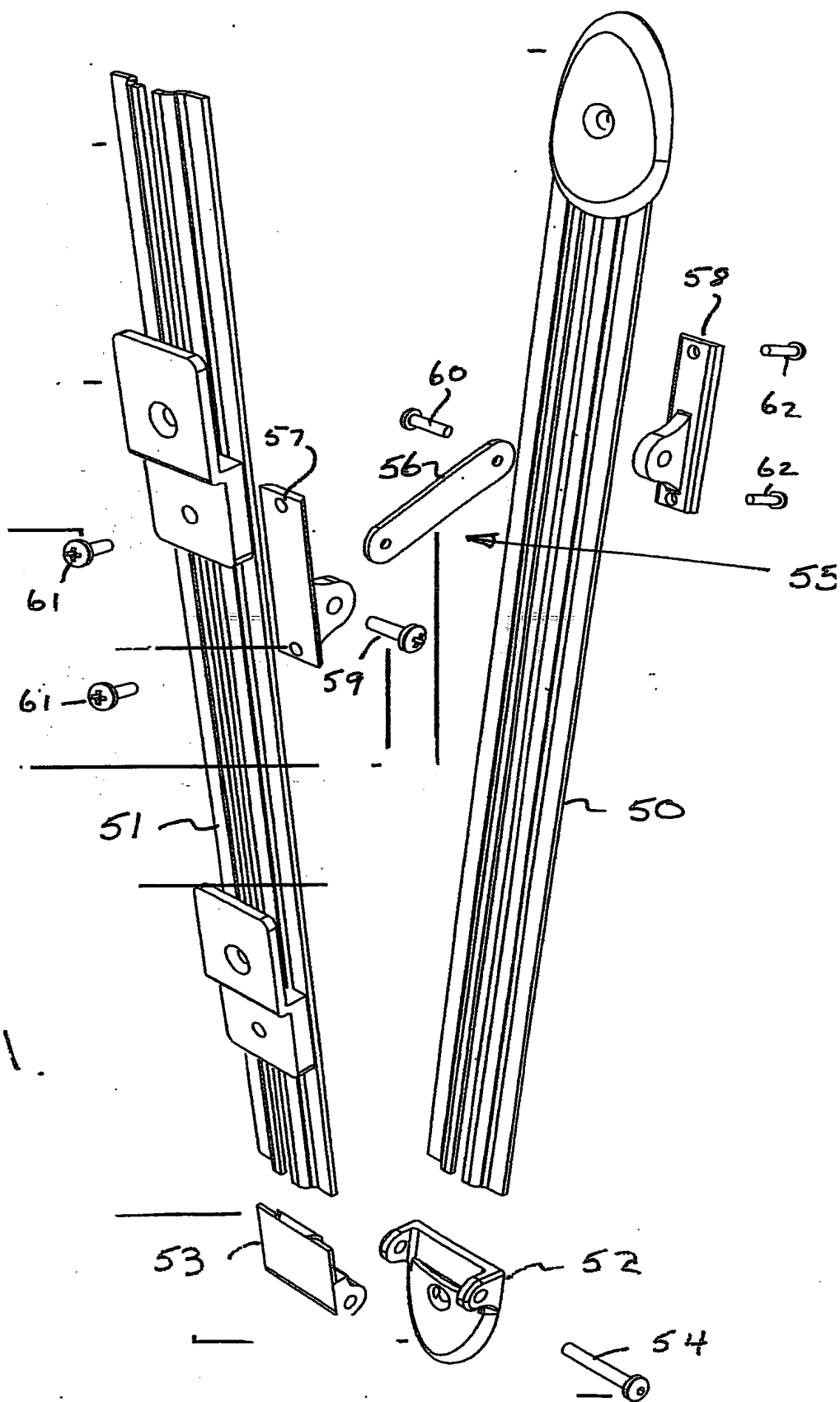
Fig. 9



B-B

Fig 10.





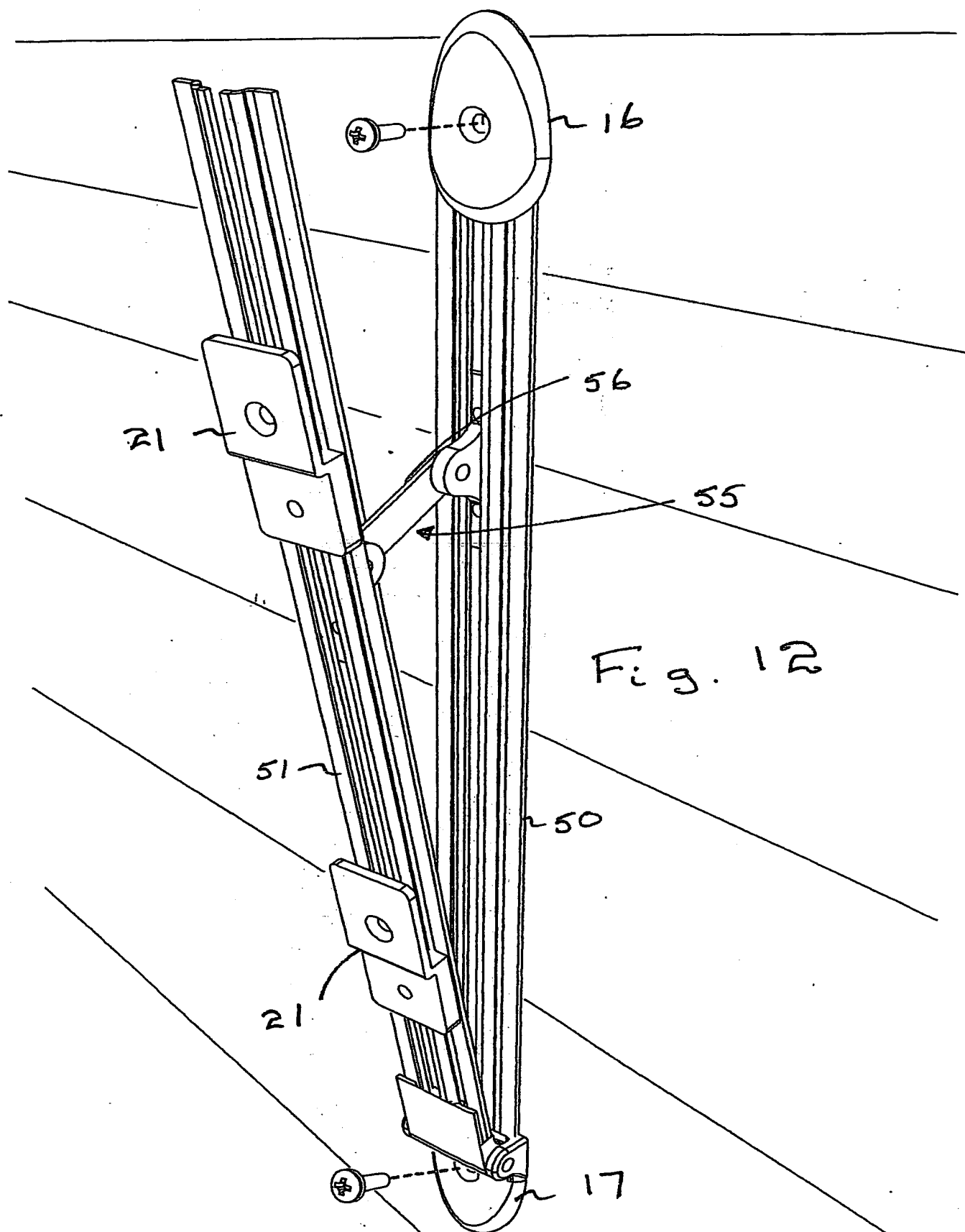


Fig 14

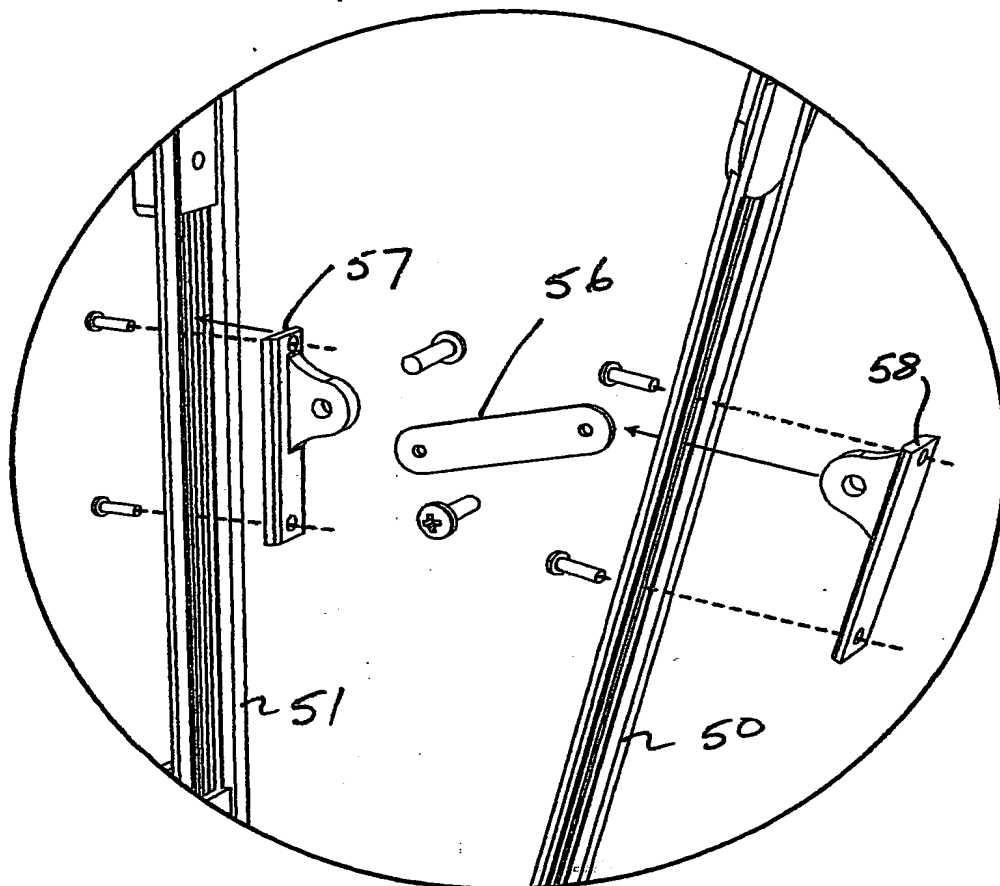
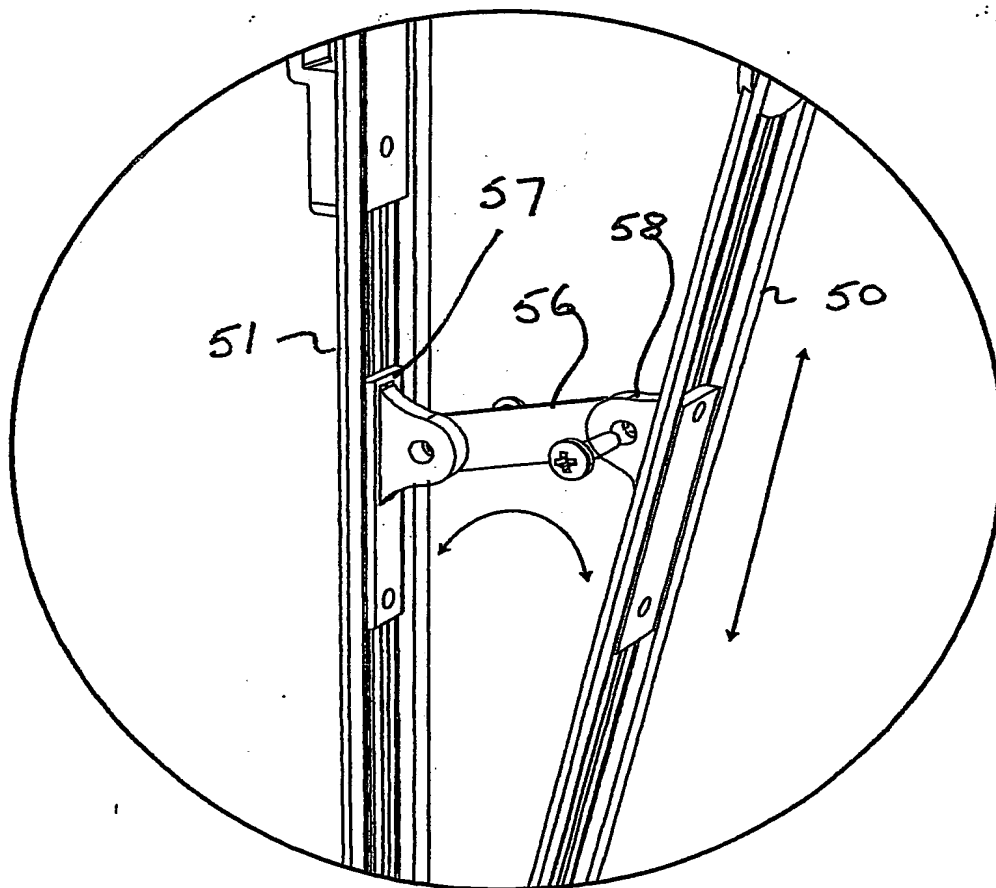


Fig 13



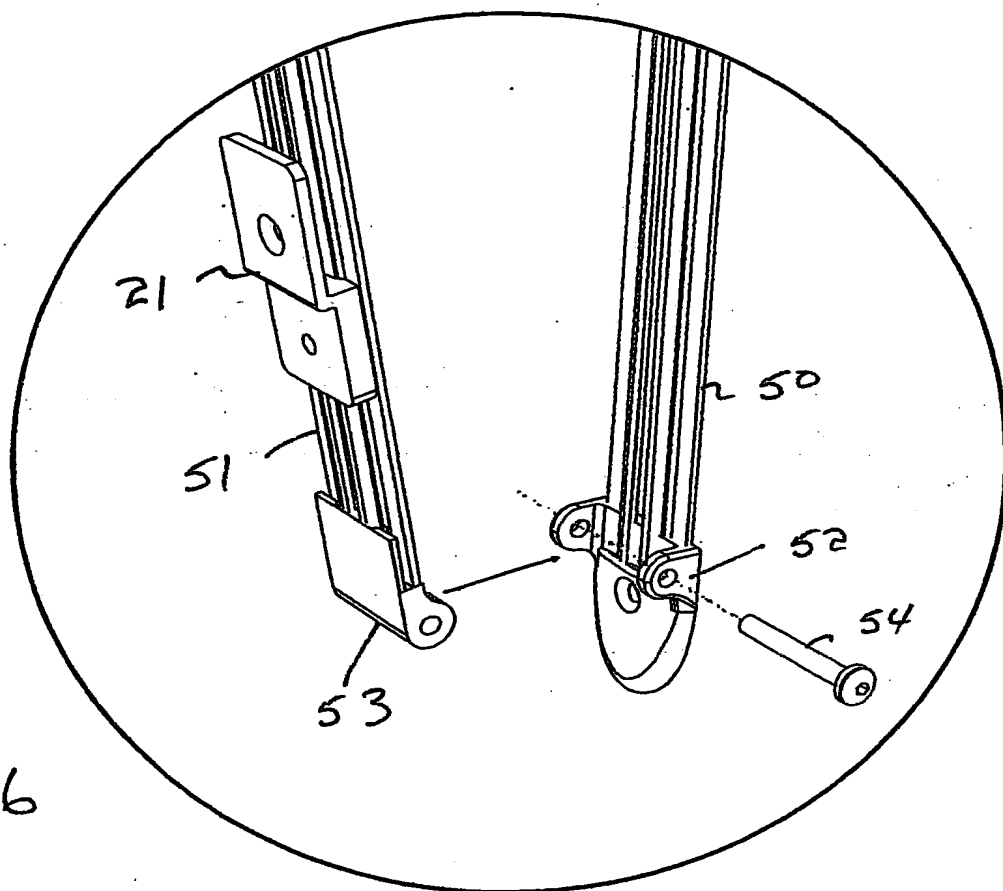


Fig. 16

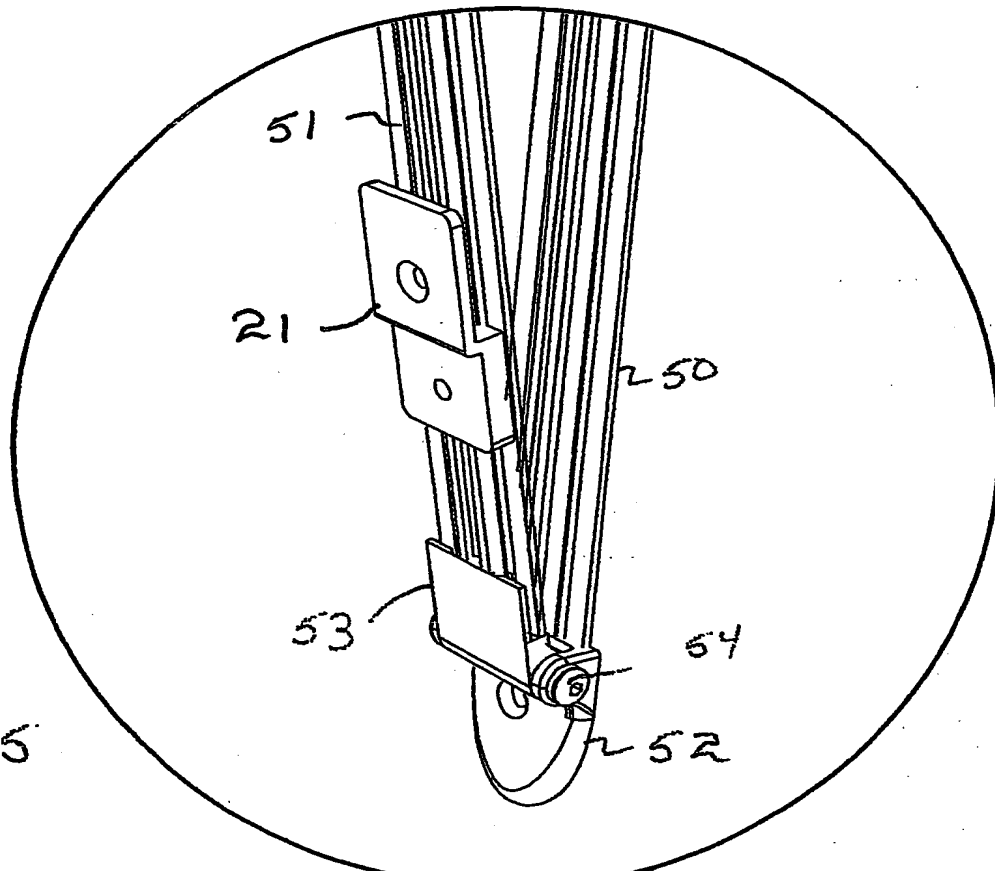


Fig. 15

FLAT PANEL DISPLAY WALL MOUNTING SYSTEM

FIELD OF INVENTION

This invention relates to wall mounting systems and, more particularly, to wall mounting systems for flat panel displays.

5 For the sake of convenience, the invention will be described in relation to Video Electronic Standards Association (VESA) compliant wall mounting systems for flat panel displays such as plasma displays, LCD displays or TFT displays. However, it is to be understood that the wall mounting system of the invention is not limited to such displays as it is applicable to the mounting of
10 other generally flat objects on a wall.

With the decreasing price of many flat panel displays employing plasma technology, liquid crystal displays or other electronic techniques such as are employed in TFT displays, there is an increasing need for these flat panel displays to be mounted quickly and securely on a wall while still allowing a
15 level of adjustability.

BACKGROUND ART

Although many small displays comply with either one of VESA's 100 mm or 75 mm mounting hole standards (which refer to the distance between the mounting holes on VESA compliant displays), many larger displays do not
20 comply with any current VESA standard. As a consequence, the prior art consists of wall mounting systems specifically designed to fit a certain make or size of display.

SUMMARY OF THE INVENTION

According to one aspect of the invention there is provided a wall
25 mounting system for a display comprising:-

- (i) an elongated rail having first and second ends, a front face and a rear face,

- 5
- (ii) means adapted to secure the rail to the wall with its rear face against the wall, and
 - (iii) a releasable mounting bracket for securing the panel display to the front face of the wall, the mounting bracket having a first portion adapted to be secure to the rail and a second portion adapted to be secure to the panel display, the first and second portions being releasably engageable with one another.

According to another aspect of the invention there is provided a wall mounting system for a display comprising:-

- 10
- (i) an elongated rail having first and second ends, a front face and a rear face,
 - (ii) an end cap for each end of the rail, each end cap being adapted to receive its end of the rail and to secure the rail to the wall with its rear face against the wall, and
 - 15 (iii) a releasable mounting bracket for securing the panel display to the front face of the rail, the mounting bracket having a first portion adapted to be secure to the rail and a second portion adapted to be secure to the panel display, the first and second portions being releasably engageable with one another.

20 Preferably, the rail consists of a pair of similar elongated rail sections, the end of each section being received in the respective end caps in spaced apart relationship so as to define an elongated slot along the rail and an elongated recess along the rear of the rail.

In a preferred form of the invention the wall mounting system includes a pair of mounting brackets with the first portions of the mounting brackets being
25 secured to the rail in a spaced apart relationship.

Preferably, the first portion of each mounting bracket is in the form of a hook having a base adapted to engage the front face of the rail and an offset hook spaced from the front face of the rail. In one embodiment of the invention, the first portion of each mounting bracket is secured to the rail by
5 fasteners which pass through the elongated slot of the rail and engage a back plate seated in the recess at the rear of the rail.

It is also preferred that the second portion of the mounting bracket has a central catch adapted to sit between the front face of the rail and the offset hook of the first portion, and a pair of outer mounting flanges by means of
10 which the second portion is secured to the panel display.

According to another aspect of the invention there is provided a wall mounting system for a display comprising:-

- (i) a first elongated rail having first and second ends, a front face and a rear face,
- 15 (ii) a first end cap for the end of the rail and a second end cap for the second end of the rail, each end cap being adapted to receive its end of the rail and to secure the rail to the wall with its rear face against the wall,
- (iii) a second elongated rail having first and second ends, a front face and a rear face,
- 20 (iv) a releasable mounting bracket for securing the panel to the front face of the second rail, the mounting bracket having a first portion adapted to be secured to the second rail and a second portion adapted to be secured to the display, the first and second portions being releasably engageable with one another,
- 25 (v) a hinge connecting the second end of the first rail to the second end of the second rail, and

- (vi) a tilt arm connected between the first rail and the second rail in between their ends, the tilt arm being movable with respect to each rail so as to adjust the angle of tilt of the second rail with respect to the first rail.

5 BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is an exploded view of a wall mounting system according to one embodiment of the invention,

Fig. 2 is a perspective view of the wall mounting system shown in Fig. 1 mounted on a wall,

10 Fig. 3 is a perspective view from behind of a panel display being mounted on a pair of wall mounting systems of Figs 1 and 2,

Fig. 4 is a view similar to Fig. 3 showing the panel display mounted on the wall mounting system,

15 Fig. 5 is an exploded view of the upper end of the wall mounting system shown in Fig. 1,

Fig. 6 is a view similar to Fig. 5 showing the first portion of the mounting bracket secured to the rail and the manner in which the second portion of the mounting bracket engages the first portion,

Fig. 7 is an enlarged view of one end of the rail and its end cap,

20 Fig. 8 is a cross sectional view of the rail shown in Fig. 7,

Fig. 9 is a cross sectional view of the end cap shown in Fig. 7,

Fig. 10 is a perspective view of the upper end of the wall mounting system showing a locking pin in place,

25 Fig. 11 is a perspective view of the wall mounting system according to a second embodiment of the invention,

Fig. 12 is a view similar to Fig. 11 showing the system being mounted on a wall,

Fig. 13 is an enlarged exploded view of the tilt arm of the wall mounting system shown in Figs. 11 and 12,

Fig. 14 is an exploded view similar to Fig. 13,

Fig. 15 is an enlarged view of the hinge end of the wall mounting system
5 shown in Figs 11 and 12,

Fig. 16 is an exploded view similar to Fig. 15.

MODES FOR CARRYING OUT THE INVENTION

The wall mounting system shown in Figs 1 to 10 includes an elongated rail 11 having a first or upper end 12 and a second or lower end 13, a front face
10 14 and a rear face 15. At the upper end 12 of the rail 11 there is an upper end cap 16 and at the lower end 13 of the rail 11 there is a lower end cap 17 by means of which the rail is secured to a wall as shown in Fig. 2.

In this instance, the wall mounting system has a pair of releasable mounting brackets 20 each of which consists of a first or hook portion 21
15 adapted to be secured to the front face of the rail 11 and a second or catch portion 22 adapted to be secured to a panel display.

The hook portion 21 has a base 23 adapted to engage the front face 14 of the rail 11 and an offset hook 24 spaced from the front face 14 of the rail 11. Both the base 23 and the hook 24 have an aperture 25 through which
20 fasteners 26 pass to engage a back plate 27.

The catch portion 22 has a central catch 28 adapted to sit between the front face 14 of the rail 11 and the offset hook 24 of the hook portion 21 and mounting flanges 29 on each side of the catch 28.

As shown in Fig. 2, the wall mounting system of this embodiment of the
25 invention is mounted on a wall by means of fasteners 39 which pass through apertures 40 in the end caps 16 and 17. The two mounting brackets 20 are adjustable with respect to each other as indicated by the arrows A. The catch

portions 22 may be mounted directly onto the back of a wall panel 42 or on to a customised plate 41 as shown in Figs 3 and 4.

In this instance, the rail 11 is formed from two offset rail sections 40 as can be clearly seen in Fig. 8. The ends of each rail section 40 are received in the shaped recesses 41 and 42 in the end caps as shown in Fig. 9. When assembled, the two rail sections 40 are in spaced relationship to one another so as to define an elongated slot 43 along the rail 11 and an elongated recess 44 along the rear face of the rail 11 as shown in Fig. 8.

A mounting bracket 20 is shown in greater detail in Figs 5 and 6. The base portion 23 of the hook portion 21 has a recess 42 on its rear face which receives the offset parts of the rail sections 40. The top fastener 26 passes through a boss 43 on the rear face of the hook 24 which abuts the ends of the rail section 40 to provide stability to the hook 24.

The catch 28 has a recess 44 which receives the boss 43 and downwardly depending from the catch portion 22 there are locking lugs 45 adapted to receive locking pin 46 as shown in Fig. 10.

This embodiment of the invention provides a quick release wall mounting system compliant with all VESA standards and is suitable for wall mounting all makes and sizes of displays be they VESA compliant or not.

The incorporation of a modular design enables the wall mounting system to be adapted to all makes and sizes of displays. The key to this adaptability is the use of the single extrusion rail sections which when assembled symmetrically using the end caps form the rail. This allows varying lengths of rails to be produced at very little cost by simply cutting the rail section or extrusions to the required length.

To accommodate variations in the vertical distance between the mounting holes on screen displays, two mounting brackets are moveable up

and down the rail. Apart from accommodating unlimited variations in the vertical distance between display mounting holes, the mounting brackets allow the height of a display to be adjusted once it is mounted on the wall.

As indicated in Figs 3 and 4, two separate wall mounting systems are used to adjust varying horizontal distances between display mounting holes. The rails of each mounting system are mounted on the wall parallel to each other at a distance apart that depends upon the panel to be displayed. Attached to any given display there will be, preferably, four catch portions 22 adapted to engage the four corresponding hook portions 21 mounted on a pair of rails 11.

The second embodiment of the invention shown in Figs 11 to 15 includes a wall mounting rail 50 and a tilt rail 51 both of which are similar to rail 11 of the first embodiment of the invention. The rails 50 and 51 are hinged together at their lower ends by a first hinge portion 52 on the rail 50 and a second hinge portion 53 on the rail 51 which are joined together by hinge pin 54.

The rails 50 and 51 are also connected together by a tilt mechanism 51 which includes a tilt arm 56 and tilt plates 57 and 58 which are connected to the arm 56 by pins 59 and 60. The tilt plate 57 is secured to the rail 51 by fastener 61 and the tilt plate 58 is secured to the rail 50 by fasteners 62. The tilt arm 56 is thus moveable with respect to each rail 50 and 51 so as to permit adjustment of the angle of tilt between the rails 50 and 51. In other respects, this embodiment of the invention resembles the first embodiment.

This embodiment of the invention allows the wall mounted displays to be mounted at varying angles from the wall's surface. This embodiment of the invention uses a modified end cap for the lower end of the rail mounted against

the wall which, as indicated above, acts as part of the hinge which connects the wall mounting rail to the tiltable rail.

Various modifications may be made in details of design and construction without departing from the scope and ambit of the invention.

CLAIMS

1. A wall mounting system for a display comprising:-
 - (i) an elongated rail having first and second ends, a front face and a rear face,
 - (ii) means adapted to secure the rail to the wall with its rear face against the wall, and
 - (iii) a releasable mounting bracket for securing the panel display to the front face of the wall, the mounting bracket having a first portion adapted to be secured to the rail and a second portion adapted to be secured to the panel display, the first and second portions being releasably engageable with one another.

2. A wall mounting system for a display comprising:-
 - (i) an elongated rail having first and second ends, a front face and a rear face,
 - (ii) an end cap for each end of the rail, each end cap being adapted to receive its end of the rail and to secure the rail to the wall with its rear face against the wall, and
 - (iii) a releasable mounting bracket for securing the panel display to the front face of the rail, the mounting bracket having a first portion adapted to be secured to the rail and a second portion adapted to be secured to the panel display, the first and second portions being releasably engageable with one another.

3. A wall mounting system according to claim 1 or claim 2 wherein the rail consists of a pair of similar elongated rail sections, the end of each section being received in the respective end caps in spaced apart relationship so as to

define an elongated slot along the rail and an elongated recess along the rear of the rail.

4. A wall mounting system according to claim 1 including a pair of mounting brackets with the first portions of the mounting brackets being secured to the rail in a spaced apart relationship.

5. A wall mounting system according to claim 4 wherein the first portion of each mounting bracket is in the form of a hook having a base adapted to engage the front face of the rail and an offset hook spaced from the front face of the rail.

6. A wall mounting system according to claim 4 wherein the first portion of each mounting bracket is secured to the rail by fasteners which pass through the elongated slot of the rail and engage a back plate seated in the recess at the rear of the rail.

7. A wall mounting system according to claim 5 wherein the second portion of the mounting bracket has a central catch adapted to sit between the front face of the rail and the offset hook of the first portion, and a pair of outer mounting flanges by means of which the second portion is secured to the panel display.

8. A wall mounting system for a display comprising:-

- (i) a first elongated rail having first and second ends, a front face and a rear face,

- (ii) a first end cap for the end of the rail and a second end cap for the second end of the rail, each end cap being adapted to receive its end of the rail and to secure the rail to the wall with its rear face against the wall,
- (iii) a second elongated rail having first and second ends, a front face and a rear face,
- (iv) a releasable mounting bracket for securing the panel to the front face of the second rail, the mounting bracket having a first portion adapted to be secured to the second rail and a second portion adapted to be secured to the display, the first and second portions being releasably engageable with one another,
- (v) a hinge connecting the second end of the first rail to the second end of the second rail, and
- (vi) a tilt arm connected between the first rail and the second rail in between their ends, the tilt arm being movable with respect to each rail so as to adjust the angle of tilt of the second rail with respect to the first rail.